



MONTANA DEPARTMENT OF TRANSPORTATION INVITATION FOR BID (IFB) (THIS IS NOT AN ORDER)

IFB Number:
#HWY-309733-RP

IFB Title:
**LIQUID CORROSION INHIBITOR FOR LIQUID SODIUM CHLORIDE BRINE,
CATEGORY A-1**

IFB Due Date and Time:
AUGUST 25, 2010
3:00 p.m., Local Time

Number of Pages: 28

ISSUING AGENCY INFORMATION

Procurement Officer:
RICHELE PARKHURST

Issue Date:
AUGUST 9, 2010

**MONTANA DEPARTMENT OF TRANSPORTATION
PURCHASING SERVICES SECTION
424 MOREY STREET
PO BOX 20437
BILLINGS MT 59104-0437**

Phone: (406) 657-0274
Fax: (406) 256-6487
TTY Users, (406) 444-7696

Website: <http://gsd.mt.gov/>

INSTRUCTIONS TO BIDDERS

**COMPLETE THE INFORMATION BELOW AND
RETURN THIS PAGE WITH YOUR SEALED BID
AND ANY REQUIRED DOCUMENTS TO:**

**#HWY-309733-RP
PURCHASING SERVICES SECTION
424 MOREY STREET
PO BOX 20437
BILLINGS MT 59104-0437**

Mark Face of Envelope/Package:

IFB Number: #HWY-309733-RP

SEALED BIDS will be received and publicly opened
in the Billings office at 3:00 pm.

BIDDERS MUST COMPLETE THE FOLLOWING

Federal Tax ID Number:

Bidder Name/Address:

Authorized Bidder Signatory:

(Please print name and sign in ink)

Bidder Phone Number:

Bidder FAX Number:

Bidder E-mail Address:

IMPORTANT: SEE STANDARD TERMS AND CONDITIONS

HIGHWAY CIVIL RIGHTS

The Contractor must, in performance of work on this contract, fully comply with all applicable federal, state or local laws, rules and regulations. The Contractor must comply with the provisions of all appropriate federal laws, including Title VI of the Civil Rights Act of 1964. Any subletting or subcontracting by the Contractor subjects subcontractors to the same provisions of the appropriate federal laws, including Title VI of the Federal Civil Rights Act of 1964. In accordance with 49-3-207, MCA, the Contractor agrees that the hiring of persons to perform work on this contract will be made on the basis of merit and qualifications and that there will be no discrimination on the basis of race, color, religion, creed, political ideas, sex, age, marital status, physical or mental disabilities or national origin by the persons performing the contract.

BILL TO: DEPT OF TRANSPORTATION
VARIOUS LOCATIONS AS
LISTED HEREIN

F.O.B. LOCATION: DEPT OF TRANSPORTATION
VARIOUS LOCATIONS AS
LISTED HEREIN

Questions may be directed to Justun Juelfs at (406) 444-7604 in Helena. However, any changes to the requirements of the Invitation for Bid (IFB) can only be made by the Montana Department of Transportation (Department) in writing and claimed oral modifications are not valid or binding.

1.0. OVERVIEW

1.1. CONTRACT SCOPE

Provide and deliver F.O.B. Various Locations as listed herein, Liquid Corrosion Inhibitor for Liquid Sodium Chloride Brine as specified herein.

1.2. CONTRACT MODIFICATIONS

The Purchasing Services Section (PSS) reserves the right to modify the resulting purchase order by mutual agreement between the PSS and the successful bidder so long as such modification is substantially within the scope of the original purchase order. Such modifications will be evidenced by issuance of a written authorized purchase order adjustment by the PSS.

1.3. CONTRACT PERIOD

The term of the purchase order resulting from this Invitation for Bid shall be from contract signature date through August 31, 2011.

1.4. CONTRACT PERFORMANCE SECURITY – ALL FORMS ACCEPTED

The Contractor must provide contract performance security based upon 100% of the contract total.

The contract performance security must be provided by the Contractor in one of the following forms, within 10 working days from the Request for Documents Notice. ONLY THE FOLLOWING TYPES OF SECURITY ARE ACCEPTABLE AND MUST BE IN ORIGINAL FORM. FACSIMILE, ELECTRONIC, OR PHOTOCOPIES ARE NOT ACCEPTABLE. Personal or business checks are not acceptable.

1.4.1. A sufficient bond from a surety company licensed in Montana with a Best's rating of no less than A- and supplied on the State of Montana's designated form entitled "Contract Performance Bond," found at <http://svc.mt.gov/gsd/OneStop/GSDDocuments.aspx>; or

1.4.2. Lawful money of the United States; or

- 1.4.3. An irrevocable letter of credit from a single financial institution and supplied on the State of Montana's designated form entitled "Irrevocable Letter of Credit," found at <http://svc.mt.gov/gsd/OneStop/GSDDocuments.aspx>; or
- 1.4.4. A cashier's check, certified check, bank money order, bank draft, certificate of deposit, or money market certificates drawn or issued by a federally or state-chartered bank or savings and loan association that is insured by or for which insurance is administered by the FDIC or that is drawn and issued by a credit union insured by the national credit union share insurance fund. Certificates of deposit or money market certificates will not be accepted as security for bid, proposal, or contract security unless the certificates are assigned only to the State. All interest income from these certificates must accrue only to the contractor and not the State.

This contract performance security must remain in effect for the entire term of the contract. A new surety bond or irrevocable letter of credit must be issued to the State of Montana if this contract is renewed.

Contract performance security must be provided to the following address: Purchasing Services Section, Attn: Richele Parkhurst, P.O. Box 20437, Billings, MT 59104-0437.

Ref: Title 18, chapter 4, part 3, MCA, Title 30, chapter 5, MCA, and ARM 2.5.502.

2.0. STANDARD TERMS AND CONDITIONS

By submitting a response to this invitation for bid, request for proposal or acceptance of a contract, the Contractor agrees to acceptance of the following Standard Terms and Conditions and any other provisions that are specific to this solicitation or contract.

2.1. ACCEPTANCE/REJECTION OF BIDS OR PROPOSALS

The Department reserves the right to accept or reject any or all bids or proposals, wholly or in part and to make awards in any manner deemed in the best interest of the Department. Bids and proposals will be firm for 30 days, unless stated otherwise in the text of the invitation for bid or request for proposal.

2.2. ACCESS AND RETENTION OF RECORDS

The Contractor agrees to provide the Department, Legislative Auditor or their authorized agents, access to any records necessary to determine contract compliance (Mont. Code Ann. § 18-1-118). The Contractor agrees to create and retain records supporting the services rendered or supplies delivered for a period of 3 years after either the completion date of the contract or the conclusion of any claim, litigation or exception relating to the contract taken by the State of Montana or third party.

2.3. ALTERATION OF SOLICITATION DOCUMENT

In the event of inconsistencies or contradictions between language contained in the Department's solicitation document and a Contractor's response, the language contained in the Department's original solicitation document will prevail. Intentional manipulation and/or alteration of solicitation document language will result in the Contractor's disqualification and possible debarment.

2.4. ANTITRUST ASSIGNMENT CLAUSE

All vendors, Contractors and subcontractors hereby assign to the State of Montana any and all claims or causes of action for any antitrust law violations or damages arising therefrom as to goods, materials and services purchased under the terms of this agreement and any change order that may result from this agreement. This assignment is made on behalf of the vendor, Contractor and all subcontractors, which may be hired or contracted with to furnish goods, materials or services.

2.5. ASSIGNMENT, TRANSFER AND SUBCONTRACTING

The Contractor shall not assign, transfer or subcontract any portion of the contract without the express written consent of the Department. (Mont. Code Ann. § 18-4-141)

2.6. AUTHORITY

The following bid, request for proposal, limited solicitation or contract is issued in accordance with Title 18, Montana Code Annotated and the Administrative Rules of Montana, Title 2, chapter 5.

2.7. BILLING

The State of Montana cannot pay for materials or services in advance. All billing against this purchase order must be made only after completion of receipt of merchandise or services rendered.

2.8. COLLUSION PROHIBITED

Prices quoted shall be established without collusion with other Contractors and without attempt to preclude the Department from obtaining the lowest possible competitive price.

2.9. COMPLIANCE WITH LAWS

The Contractor must, in performance of work under the contract, fully comply with all applicable federal, state or local laws, rules and regulations, including the Montana Human Rights Act, the Civil Rights Act of 1964, the Age Discrimination Act of 1975, the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973. Any subletting or subcontracting by the Contractor subjects subcontractors to the same provision. In accordance with section 49-3-207, MCA, the Contractor agrees that the hiring of persons to perform the contract will be made on the basis of merit and qualifications and there will be no discrimination based upon race, color, religion, creed, political ideas, sex, age, marital status, physical or mental disability or national origin by the persons performing the contract.

2.10. CONFORMANCE WITH CONTRACT

No alteration of the terms, conditions, delivery, price, quality, quantities or specifications of the contract shall be granted without prior written consent of the Department's Purchasing Section. Supplies delivered which do not conform to the contract terms, conditions and specifications may be rejected and returned at the Contractor's expense.

2.11. DEBARMENT

The Contractor certifies, by submitting this bid or proposal, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction (contract) by any governmental department or agency. If the Contractor cannot certify this statement, attach a written explanation for review by the State.

2.12. DISABILITY ACCOMMODATIONS

The State of Montana does not discriminate on the basis of disability in admission to, access to, or operations of its programs, services or activities. Individuals, who need aids, alternative document formats or services for effective communications or other disability-related accommodations in the programs and services offered are invited to make their needs and preferences known to this office. Interested parties should provide as much advance notice as possible.

2.13. EXCEPTIONS

A prospective Contractor may take "exception" to bid terms, conditions, specifications and dates stated within the bid package. However, the Department reserves the right to disqualify any and all bids submitted which include exceptions, if deemed not in the Department's best interest.

2.14. FACSIMILE RESPONSES

Facsimile bids sent directly to the Department of Transportation will not be accepted; however, facsimile bids sent to a 3rd party and then delivered to the Department in a properly addressed, sealed envelope will be accepted.

2.15. FAILURE TO HONOR BID/PROPOSAL

If a bidder/Contractor to whom a contract is awarded refuses to accept the award (PO/contract) or, fails to deliver in accordance with the contract terms and conditions, the Department may, in its discretion, suspend the bidder/Contractor for a period of time from entering into any contracts with the State of Montana.

2.16. FORCE MAJEURE

Neither party shall be responsible for failure to fulfill its obligations due to causes beyond its reasonable control, including without limitation, acts or omissions of government or military authority, acts of God, materials shortages, transportation delays, fires, floods, labor disturbances, riots, wars, terrorist acts or any other causes, directly or indirectly beyond the reasonable control of the non-performing party, so long as such party is using its best efforts to remedy such failure or delays.

2.17. HOLD HARMLESS/INDEMNIFICATION

Contractor agrees to defend, protect, indemnify and save harmless the State of Montana and Department against and from all claims, liabilities, demands, causes of action, judgments (including costs and reasonable attorneys fees) and losses to them from any cause whatever (including patent, trademark and copyright infringements) from the Agreement and its execution. This includes any suits, claims, actions, losses, costs or damages of any kind, including the State's and Department's legal expenses, arising out of, in connection with, or incidental to the Agreement, but does not include any such suits, claims, actions, losses, costs or damages which are solely the result of the negligent acts, omissions or misconduct of Department's employees if they do not arise out of, depend upon or relate to a negligent act, omission or misconduct of Contractor's employees. The Contractor assumes all responsibility for ensuring and enforcing safe working conditions and compliance with all safety-related rules and regulations for the benefit of its own employees, the employees of any subcontractor and the public. That responsibility includes all duties relating to safety, regardless of whether any such duties are, or are alleged to be, "nondelegable" (e.g., the Montana Safe Place to Work Statute, etc.). This indemnification is expressly intended by the parties to include any claims, liabilities, demands, causes of action, judgments (including costs and reasonable attorneys fees) and losses that are, or are alleged or held to be, based upon a breach by the Department of a nondelegable duty relating to workplace safety for the Contractor's employees, the employees of any subcontractor and the public.

2.18. LATE BIDS AND PROPOSALS

Regardless of cause, late bids and proposals will not be accepted and will automatically be disqualified from further consideration. It shall be solely the Contractor's risk to assure delivery at the designated office by the designated time. Late bids and proposals will not be opened and may be returned to the Contractor at the expense of the Contractor or destroyed if requested.

2.19. PAYMENT TERM

All payment terms will be computed from the date of delivery of supplies or services OR receipt of a properly executed invoice, whichever is later. Unless otherwise noted in the solicitation document, the Department is allowed 30 days to pay such invoices. All Contractors may be required to provide banking information at the time of contract execution in order to facilitate state electronic funds transfer payments.

2.20. PREPARATION OF BIDS

Bids must be written in ink and/or typewritten on bid forms furnished herewith. Erasures and alterations must be initialed by the Contractor in ink. Verbal bids will not be accepted. Facsimile bids sent directly to the Department will not be accepted; however, facsimile bids sent to a third party and then delivered to the Department in a properly addressed, sealed envelope will be accepted. Bid quotations shall be considered firm for 30 days after the date of opening unless otherwise stated in writing within the bid package.

2.21. RECIPROCAL PREFERENCE

The State of Montana applies a reciprocal preference against a Contractor submitting a bid from a state or country that grants a residency preference to its resident businesses. A reciprocal preference is only applied to an invitation for bid for supplies or an invitation for bid for nonconstruction services for public works as defined in section 18-2-401(9), MCA and then only if federal funds are not involved.

For a list of states that grant resident preference, see
<http://gsd.mt.gov/ProcurementServices/preferences.mcp>

2.22. REFERENCE TO CONTRACT

The contract or purchase order number MUST appear on all invoices, packing lists, packages and correspondence pertaining to the contract.

2.23. REGISTRATION WITH THE SECRETARY OF STATE

Any business intending to transact business in Montana must register with the Secretary of State. Businesses that are incorporated in another state or country, but which are conducting activity in Montana, must determine whether they are transacting business in Montana in accordance with sections 35-1-1026 and 35-8-1001, MCA. Such businesses may want to obtain the guidance of their attorney or accountant to determine whether their activity is considered transacting business.

If businesses determine that they are transacting business in Montana, they must register with the Secretary of State and obtain a certificate of authority to demonstrate that they are in good standing in Montana. To obtain registration materials, call the Office of the Secretary of State at (406) 444-3665 or visit their website at <http://sos.mt.gov/>.

2.24. REJECTION OF BIDS

The Department reserves the right to reject any and all bids (wholly or in part) which fail to meet the terms, conditions and specifications of the bid package; or, are determined to be not in the Department's best interests; or, for which funding is not available. The Department reserves the right to reject bid proposals, waive technicalities or advertise for new proposals. Bids will be firm for 30 days, unless stated otherwise in the text of this invitation for bid.

A written or verbal explanation regarding rejected bids may be obtained by contacting the Purchasing Services Section (406) 657-0274 in Billings.

2.25. SEPARABILITY CLAUSE

A declaration by any court, or any other binding legal source, that any provision of the contract is illegal and void shall not affect the legality and enforceability of any other provision of the contract, unless the provisions are mutually dependent.

2.26. SHIPPING

Supplies shall be shipped prepaid, F.O.B. Destination, unless the contract specifies otherwise.

2.27. SOLICITATION DOCUMENT EXAMINATION

Contractors shall promptly notify the Department of any ambiguity, inconsistency or error, which they may discover upon examination of a solicitation document.

2.28. TAX EXEMPTION

The State of Montana is exempt from Federal Excise Taxes (#81-0302402).

2.29. TECHNOLOGY ACCESS FOR BLIND OR VISUALLY IMPAIRED

Contractor acknowledges that no state funds may be expended for the purchase of information technology equipment and software for use by employees, program participants or members of the public unless it provides blind or visually impaired individuals with access, including interactive use of the equipment and services, that is equivalent to that provided to individuals who are not blind or visually impaired. (Mont. Code Ann. § 18-5-603) Contact the State Procurement Section at (406) 444-2575 for more information concerning nonvisual.

2.30. TERMINATION OF CONTRACT

Unless otherwise stated, the Department may, by written notice to the Contractor, terminate the contract in whole or in part at any time the Contractor fails to perform the contract.

2.31. UNAVAILABILITY OF FUNDING

The contracting agency, at its sole discretion, may terminate or reduce the scope of the contract if available funding is reduced for any reason. (Mont. Code Ann. § 18-4-313 (3))

2.32. UNIT PRICE

Unless otherwise specified, the unit price for each line item must be provided in the appropriate space within the bid document. This shall be known as the "base" bid. The unit price for multiple items must be extended to reflect the total price for the quantity of items requested. Unless otherwise specified, the unit price shall prevail.

2.33. U.S. FUNDS

All prices and payments must be in U.S. dollars.

2.34. VENUE

This solicitation is governed by the laws of Montana. The parties agree that any litigation concerning this bid, request for proposal, limited solicitation or subsequent contract, must be brought in the First Judicial District in and for the County of Lewis and Clark, State of Montana and each party shall pay its own costs and attorney fees. (Mont. Code Ann. § 18-1-401)

2.35. WARRANTIES

The Contractor warrants that items offered will conform to the specifications requested, to be fit and sufficient for the purpose manufactured, of good material and workmanship and free from defect. Items offered must be new and unused and of the latest model or manufacture, unless otherwise specified by the State. They shall be equal in quality and performance to those indicated herein. Descriptions used herein are specified solely for the purpose of indicating standards of quality, performance and/or use desired. Exceptions will be rejected.

3.0. SPECIAL TERMS AND CONDITIONS

3.1. ADDITION OF NEW DELIVERY LOCATIONS

New delivery locations may be added at any time during the term of this contract by PSS contacting the successful bidder directly. PSS shall allow the successful bidder five (5) business days to set-up a new location, pricing and delivery logistics.

3.2. LIQUIDATED DAMAGES

Liquidated damages will be assessed as a result of the successful bidder's failure to perform as defined herein. The successful bidder will be assessed in an amount(s) specified in this Invitation for Bid. Liquidated damages for orders that fail to meet delivery dates and after hours delivery notification and failure to meet product specifications.

3.3. TRAINING REQUIREMENTS

The successful bidder may be required to provide training to the Department's personnel as needed. Training must be provided when the first load is delivered and continue until the Department's personnel are fully trained and capable of mixing the inhibitor package with the salt brine solution to replicate the finished brine product assessed during the award process.

Training shall include, but is not limited to:

- Method of measurement of inhibitor to be added to the brine solution
- Method of mixing the brine with the inhibitor
- Mixing method, times, etc.
- Storage and circulation issues in regards to the inhibitor and completed brine
- Proper sampling methods when receiving a shipment
- Verification that the end product is mixed correctly

3.4. INVOICING REQUIREMENTS

Any single delivery of deicer product may utilize a combination of rail and truck delivery or just truck delivery.

A copy of the bill of lading must accompany each invoice. Failure to provide the information as stated will result in the invoice being returned to the successful bidder for correction.

4.0. COMMODITY SPECIFICATIONS

4.1. GENERAL SPECIFICATIONS

This specification is for a liquid corrosion inhibitor that when added to a concentrated sodium chloride brine will provide a finished product that is compliant to the PNS Chemical Deicer Specifications, and as designated within this specification.

The successful bidder must provide the mixing requirements for their product with the bid. Failure to provide mixing requirements with the bid will result in bid disqualification.

The inhibitor product bid must have the capability to be mixed fully into the concentrated sodium chloride brine solution at a minimum temperature of 15° F.

The successful bidder of any product that is delivered and/or applied, which is found to be contaminated and is cause for environmental concerns, shall be responsible for all clean up expenses. This includes but is not limited to clean up measures as needed for the following: storage facility, yard, equipment, and roadside.

The successful bidder shall be liable, as determined by the Department for causing any unanticipated extraordinary damages to equipment used in the storage or distribution of the chemical products.

The resulting corrosion inhibited salt brine prepared according to the manufacture's specifications that contains any constituent in excess of the following established total concentration limits as tested in accordance with the listed test methodology from Section 8.0. shall not be acceptable. Results are stated as parts per million (ppm).

Arsenic	5.0 ppm
Barium	100.0 ppm
Cadmium	0.20 ppm
Chromium	1.0 ppm
Copper	1.0 ppm
Lead	1.0 ppm
Mercury	0.05 ppm
Selenium	5.0 ppm
Zinc	10.00 ppm
Phosphorus	2500 ppm
Cyanide	0.20 ppm

4.2. CATEGORY 1 – CORROSION INHIBITOR FOR SODIUM CHLORIDE (SALT) BRINE SPECIFICATIONS

This specification is for a liquid corrosion inhibitor for field addition to concentrated sodium chloride (salt) brine.

The finished corrosion inhibited sodium chloride shall have a minimum sodium chloride concentration of no less than 21% and shall have a Corrosion Percent Effectiveness Rating of 30% or less as tested by PNS specifications.

This liquid corrosion inhibitor when added to concentrated sodium chloride brine will provide a finished product that is compliant to all the General Provisions of the PNS Specifications.

The finished product shall provide eutectic temperature points equal to or lower than that of a standard uninhibited liquid sodium chloride brine of 23.3% concentration. The manufacture shall provide a eutectic temperature graph and table showing both eutectic curves of the finished product and the standard uninhibited liquid sodium chloride solution of 23.3% concentration for direct comparison. The graph shall be constructed according the specifications in Section II Sample Submittals.

For testing purposes, the inhibitor product shall be added to reagent grade sodium chloride brine prepared from distilled water meeting ASTM D 1193 Type II. The salt brine concentration will be prepared in a weight to weight ratio with water. The inhibitor concentration will be added as a volume to volume measurement to the brine solution. The sodium chloride brine and inhibitor concentrations will be prepared according to the inhibitor manufacturer's specifications and guidelines.

The inhibitor shall be capable of being homogenously mixed with the 23% to 24% concentration of sodium chloride brine and resulting in a finished product that does not separate or settle out.

The corrosion inhibitor product bid shall be flowable and have the capability to be mixed fully into the concentrated sodium chloride brine solution at a minimum temperature of 15° F.

Temperature Storage Class of Inhibitor: The corrosion inhibitor must be capable of being stored at a minimum temperature of 10 F.

This chemical product shall not contain greater than 1.0% (V/V) Total Settleable Solids and shall have Ninety-nine percent (99.0%) of the Solids Passing through a Number 10 sieve after being stored at the designated Temperature Storage Class (+/- 2°F) for 168 hours (Seven days).

- Test Method: Number 6

4.3. TEST METHODS

4.3.1. Number 6: Percent Total Settleable Solids and Percent Solids Passing a 10 Sieve at 0° F

Test Method: This procedure is listed as Test Method "B".

5.0. ORDERS, DELIVERIES, AND INVOICING OF PRODUCTS

5.1. ORDERS

- 5.1.1. All orders will be placed by fax. The official order date shall be the date of the fax transmittal if received by the successful bidder before 2:00 p.m. (all order times reflect bidders' time) and the next day if received by the successful bidder after 2:00 p.m. The successful bidder shall fax back to the Department a confirmation of receipt and an estimate of the order shipment date within two (2) business hours.

5.2. DELIVERIES

- 5.2.1. Deliveries shall be made during normal working hours (Monday through Friday between the hours of 7:00 A.M. and 3:00 P.M. MST), with a minimum of 24 hours advance notice of arrival time unless otherwise requested or agreed to by the Department. Any deliveries made without proper advance notification or outside of the established delivery times, unless otherwise authorized in advance and in writing will be assessed an initial price adjustment of 25% of the purchase price of the product.
- 5.2.2. Delivery shall be made on or within five (15) calendar days or less on all orders received by the successful bidder. In the event the successful bidder fails to deliver within the required number of calendar days, a 5% price adjustment per day will be assessed for each day of delay, starting on day 16, and continuing until delivery is made. The late delivery fee assessment will be deducted from the payment of the invoice for the specific load of product not delivered according to the terms of this agreement. Consistently late deliveries may result in contract termination.
- 5.2.3. Any assessments or deductions charged for improper notification and/or delivery will be accompanied with verification of order, delivery date, and order time.
- 5.2.4. Price adjustments assessed for late deliveries caused by what the successful bidder feels are "reasonable or uncontrollable circumstances" shall within seven (7) calendar days be addressed with the Department's representative. The decision of the Department's representative to accept or to deny the claim will be final and in the best interest of the Department.
- 5.2.5. The successful bidder will be responsible for all necessary equipment to transfer liquid chemical products to the Department's storage tanks. The Department's storage tanks will be fitted with a three-inch male pipe fitting to allow for unloading of product.
- 5.2.6. Each shipment shall be accompanied by a current and clearly legible MSDS.
- 5.2.7. The bill of lading for each shipment must contain the following information:
- 5.2.7.1. Name of product.
 - 5.2.7.2. Supplier and manufacturer of product.
 - 5.2.7.3. Delivery Destination.
 - 5.2.7.4. Total number of units being delivered.

- 5.2.7.5. Total weight of delivery using a certified scale ticket or certified flow meter. As an option on liquid deliveries only, the bidder can use a legibly printed certified ticket from a flow meter that has been tested and certified by an approved PNS member's agency of Weight and Measures. The certification of the meter shall not be older than one year.

Any PNS member can request that the meter be retested and certified again during the delivery year if the data from the meter is in question. This retesting and certification shall be done at no extra charge to the PNS member. Reciprocity among the PNS members for meter calibration may be employed. **The bidder shall provide a copy of the certification and product information about the flow meter at the time of bid.** The PNS member may at any time choose to spot check a delivery of liquid product by having the load weighed on certified scales before and after delivery to insure the accuracy of the flow meter. No additional cost will be charged to the PNS member for spot-checking deliveries of liquid products.

- 5.2.7.6. Lot or any other identification number for the product being delivered. The Lot Number is a specific number assigned to that particular product as delivered. This number must be denoted as the "**LOT NUMBER**" on the bill of lading and shall be clearly legible. The lot number must enable the Department to track a delivered product back to its manufacture point, date of manufacture and specific batch. **Failure to have a defined LOT NUMBER that appears on the Bill of Lading is grounds for rejection of the load.**

- 5.2.8. Transport information--Name of transporting company, tank, trailer or rail car number, point and date of origin.

5.3. INVOICING

- 5.3.1. The Department will not process invoices for payment until the successful bidder has met all requirements under this section. The invoice shall include the following:

- 5.3.1.1. A copy of the original bill of lading.
- 5.3.1.2. Contract unit of measure.
- 5.3.1.3. Total number of units delivered.
- 5.3.1.4. Contract unit price for product delivered.
- 5.3.1.5. Total price for units delivered.

6.0. FIELD INSPECTION, UNLOADING, SAMPLING AND TESTING

All material is subject to field inspection, sampling, and testing on an as delivered base. Sampling and field-testing is the prerogative of the Department. The successful bidder shall not off load any material without affording the Department an opportunity to conduct the field inspection, sampling or the testing. Off-loading of material without affording the Department an opportunity to conduct said work shall deem the delivered material non-compliant and is subject to total rejection. The successful bidder shall only off load material without field inspection, testing and sampling by the Department when the Department representative grants prior written approval.

6.1. FIELD INSPECTION

BEFORE ALLOWING ANY PRODUCT TO BE UNLOADED, DEPARTMENT PERSONNEL WILL ADHERE TO THE FOLLOWING PROCEDURES:

- 6.1.1. Document and maintain records on all deliveries, including those that are rejected.
- 6.1.2. Check to assure that the product is being delivered according to the terms of the contract. This may include but is not limited to the following:
 - 6.1.2.1. Date of the order.
 - 6.1.2.2. Date and time of delivery.
 - 6.1.2.3. Verification of advance delivery notification.
 - 6.1.2.4. Delivered within allowable times.
 - 6.1.2.5. Name of Delivery Company and license plate numbers.
 - 6.1.2.6. Is any price adjustment assessments required?
 - 6.1.2.7. Is the product being delivered what you ordered?
 - 6.1.2.8. Document all procedures prior to unloading of product.
 - 6.1.2.9. Verify that all papers required of a delivery are present, complete, and legible.
- 6.1.3. Accurate, complete, and legible bill of lading and/or invoice.
 - 6.1.3.1. Legible and current MSDS sheet.
 - 6.1.3.2. Certified weight slip.
- 6.1.4. Verify separation or non-separation of product.
- 6.1.5. Visually inspect the load to determine if there are any obvious reasons why the load should be rejected.
- 6.1.6. No precipitate or flocculation in liquid products shall be allowed in excess of the specification limits. Material portraying these or other uncharacteristic traits when delivered may be immediately rejected at the option of the Department or their representative at the delivery location.
- 6.1.7. Any problems must be noted at the point of delivery by Department personnel, documented, and relayed to their Department representative for action.

6.2. UNLOADING

- 6.2.1. Provided that all the required information is in place and the material appears to be the correct material as ordered, document the amount of product currently in storage prior to unloading and begin the unloading process.
- 6.2.2. Visually inspect the discharge valve prior to unloading for the presence of any foreign material.

- 6.2.3. Visually inspect the delivered product again while unloading. If problems are noted that are a cause for rejection of the load, immediately halt the unloading process. Take photos if applicable and record any pertinent information. Conduct the following procedures if the material is to be rejected.
 - 6.2.3.1. If material fails the field inspection or testing, reload the product and reject the load.
 - 6.2.3.2. If reloading can't be done, (mixed with previous material) note the amount of product pumped into the tank and total product now present in the tank.
 - 6.2.3.3. Circulate the tank and then pull two one-gallon (4 Liter) samples of the contaminated chemical material now in the tank
 - 6.2.3.4. Check and record the specific gravity of the samples.
 - 6.2.3.5. Take appropriate action as needed to assure the integrity of product on hand if possible. Will all products on hand have to be removed?
 - 6.2.3.6. Send samples directly to the Department's designated testing laboratory.
 - 6.2.3.7. Immediately advise the Department's Representative of any ordering, delivery, storage, or product quality issues.

6.3. SAMPLING AND TESTING

One sample, of the liquid product being delivered, may be taken from the delivered shipment for laboratory testing after the shipment has passed the initial inspection and is approved for unloading. This sample will be used for testing and/or fingerprinting at the Department's expense to insure product quality. A one-gallon sample will be taken from the transfer hose in three equal parts. Each part will be compositely mixed together with the other parts to make up the one-gallon sample that will be submitted to the laboratory for testing. The samples will be collected during unloading as the first third, the second third and the last third of the product that is being delivered. If the trailer or pup has compartments the three equal samples shall be taken from only one of the compartments to complete the sample. The specific gravity of the samples will be checked and recorded.

- 6.3.1. Samples sent to the Department's Laboratory will be tested for conformance to specification during the year. Product may be tested for those parameters listed in the General Specifications and any other appropriate requirements listed herein.
- 6.3.2. Acceptance. If the test results indicate the sample does not meet the specifications, the successful bidder may make a written request for an independent laboratory to retest the liquid material in question. The successful bidder and the Department must agree upon the choice of the independent laboratory before release of the sample for testing. The Department will maintain and provide the original sample in the event of a retest. The independent laboratory results will be averages with the results provided by the Department and the averaged results will be binding on both parties for acceptance of the liquid material in question. The successful bidder must pay the cost of duplicate testing if the average results in a failing test. The Department will pay the cost of duplicate testing if the average results in a passing test.

7.0. PRODUCT REJECTION AND PRICE ADJUSTMENTS

7.1. PRODUCT REJECTION

Products, which fail to meet the specification requirements, will be subject to the following specified price adjustments and/or total rejection as per the Department's discretion. The successful bidder will be required to replace any rejected material plus any material that it contaminated at their cost. Any product that is rejected shall be removed by the successful bidder and replaced with product that meets the material specifications, including handling and transportation charges at no additional cost to the Department. Removal includes the removal of all material contaminated by the non-specification material if any. Department's personnel will establish the amount of material contaminated. Two shipments per contract year of product found by the Department to be beyond any acceptable range may result in contract termination.

7.2. PRICE ADJUSTMENTS

Determination of a price adjustment to be applied will be based on the PNS testing procedures as outlined in the specifications.

All applicable price adjustments will be based on the liquid inhibitor being prepared as outlined in the General Specifications. These price adjustments are not to be based on finished product sampled from the Department's field tanks. However, finished material from the field will be monitored to determine the quality of the inhibitor and if the inhibitor is providing finished material as designed by the manufacturer and these specifications.

All price adjustments will be based on the prices as quoted by the successful bidder .

7.2.1. PRICE ADJUSTMENTS FOR TOTAL METALS, TOTAL PHOSPHOROUS AND TOTAL CYANIDE

Materials tested for the total concentration of Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Zinc, Phosphorus and Cyanide and found to have exceeded the specification limits are subject to price adjustments. The price adjustments for the finished brine product will be taken according to the following table.

PERCENTAGE OVER THE SPECIFIED LIMIT	PRICE ADJUSTMENT
0 to 5.0	None
5.1 to 20.0	15%
20.1 to 40.0	25%
40.1 to 75.0	35%
75.1 to 100.0	50%
Over 100.1	100%

7.2.2. PRICE ADJUSTMENTS FOR PERCENT CORROSION EFFECTIVENESS

Price adjustments for corrosion effectiveness range (30%) will be taken as follows.

PERCENT CORROSION EFFECTIVENESS	PRICE ADJUSTMENT
30.1% to 35.0%	15%
35.1% to 50.0%	50%
50.1% or greater	100%

7.2.3. PRICE ADJUSTMENTS FOR TOTAL SETTLEABLE SOLIDS AND PERCENT PASSING THE NO. 10 SIEVE AT 0° F.

Materials tested for the Total Settleable Solids and Percent Solids Passing on a No. 10 sieve and found to have exceeded the specification limits are subject to price adjustments. The price adjustments will be taken according to the following tables.

TOTAL SETTEABLE SOLIDS

PERCENT SETTLEABLE SOLIDS	PRICE ADJUSTMENT
1.1 to 1.5	None
1.6 to 3.5	25%
3.6 to 5.0	50%
5.1 to 7.5	75%
7.6 and above	100% or Rejection

PERCENT SOLIDS PASSING ON A NO. 10 SIEVE

PERCENT PASSING THE NO. 10 SIEVE	PRICE ADJUSTMENT
98.5 to 98.9	None
98.0 to 98.4	35%
97.5 to 97.9	50%
97.4 and below	100% or Rejection

7.2.4. PRICE ADJUSTMENTS FOR pH

The pH analysis will be on the finished product. The price adjustments will be taken according to the following table.

pH ANALYSIS	PRICE ADJUSTMENT
5.5 – 6.0	None
5.0 – 5.4	25%
4.5 – 4.9	50%
< 4.5	100%

8.0. BID EVALUATION PROCESS

Bids shall be accompanied with the most recent detailed product specification sheet and Material Safety Data Sheet (MSDS). All documents must be clearly legible.

The successful bidder shall provide a MSDS for the finished brine product.

The successful bidder **must** provide two (2) 1-quart samples with their bid. Failure to provide the samples will result in bid disqualification.

9.0. BIDDER & PRODUCT INFORMATION

9.1. BIDDER INFORMATION

Company Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____

Bidders Authorized Representative: _____

9.2. INFORMATION TO BE INCLUDED WITH BID SUBMITTAL

- Material Safety Data Sheets (MSDS) for the inhibitor: _____
- Material Safety Data Sheets (MSDS) for the finished brine product: _____
- Mixing requirements; (what % of inhibitor added to 23% of salt brine – by volume or by weight, etc.)
- Explain in detail below or provide the information on a separate from with the bid.

9.3. INHIBITOR PRODUCT

➤ Inhibitor Product Name: _____

➤ Range of Specific Gravity: _____

9.4. BIDDER NOTE

Have you completely read the PNS specifications and included all the required information in the bid package: YES _____ NO _____

10.0. DELIVERY LOCATIONS

The following quantities of liquid inhibitor product are projected for use for the term of this contract. These quantities are estimates to be used for bidding purposes only. They are not guaranteed deliverable quantities as the winter weather can and does change and quantities may be less or more than what is being represented.

BILL TO: **MONTANA DEPARTMENT OF TRANSPORTATION**
PO BOX 7039
MISSOULA, MT 59807-7039

DELIVER TO:

1) Location: DeSmet Stockpile

Estimated Quantity: 45,454 Gallons

Delivery Information: I-90, MP 96.3

Price per Gallon of Delivered Inhibitor Product: \$ _____

[illegible]

BILL TO: **MONTANA DEPARTMENT OF TRANSPORTATION**
BOX 7308
KALISPELL, MT 59904-0308

DELIVER TO:

1) Location: Whitefish Maintenance Section

Estimated Quantity: 54,545 Gallons

Delivery Information: MT-40, MP 1.0

Price per Gallon of Delivered Inhibitor Product: \$ _____

[illegible]

BILL TO: MONTANA DEPARTMENT OF TRANSPORTATION
PO BOX 3068
BUTTE, MT 59702-3068

DELIVER TO:

1) Location: Lincoln Pit

Estimated Quantity: 5,151 Gallons

Delivery Information: U-5809, MP 7.2

Price per Gallon of Delivered Inhibitor Product: \$

APPENDIX

**TEST METHOD “A” – Corrosion Rate As Conducted From The NACE
Standard TM0169-95 (1995 Revision) As Modified
By The Pacific Northwest States**

TEST METHOD “B” – Percent Total Settleable Solids and Percent Solids Passing a 10 Sieve

TEST METHOD A

Corrosion Rate As Conducted From The NACE Standard TM0169-95 (1995 Revision) And As Modified By The Pacific Northwest States

Products that are submitted to meet the Corrosion Rate Test and to have a Percent Effectiveness determined shall be tested according to the National Association of Corrosion Engineers (NACE) Standard TM0169-95 as modified by the PNS. **The PNS has modified this procedure so that the test procedure uses 30 ml of a 3% chemical product solution as received per square inch of coupon surface area for the corrosion test.** Corrosion inhibited chemical product must prove to have a Percent Effectiveness value of at least 70% less than Sodium Chloride (salt) to be acceptable.

I. PREPARATION OF THE COUPONS

The coupons used are 1/2" (approximately 1.38 in. x 0.56 in. x 0.11 in.) flat steel washers displaying a density of approximately 7.85 grams per cubic centimeter. (Note: No galvanized coupons are allowed to be used even after removing the zinc with acid. Hot dipped galvanization creates a Fe-Zn metallurgical surface bond that changes the characteristics of the steel. Coupons must meet ASTM F 436, Type 1, with a Rockwell Hardness of C 38-45. Each coupon used in the test procedure is subjected to the following process to assure accuracy in test results.

- Wipe with suitable solvent to remove grease and oil.
- Examine each coupon for metallurgical abnormalities and reject those that are suspect to flaws.
- All coupons are tested for Rockwell Hardness of C 38-45; coupons having hardness outside of this range are rejected.
- Acceptable coupons are stamped for identification.
- Coupons are acid etched with 1 + 1 HCl for approximately 2 -3 minutes.
- The coupons are then quickly rinsed with tap water, distilled water, wiped dried and placed in chloroform.
- When the coupons are removed from the chloroform for use, they are placed on a paper-lined tray (not touching each other) and allowed to air dry in a ventilated hood for a minimum of 15 minutes.
- Coupons are measured as specified. (Note: If latex gloves are not worn during measuring, the coupons should be rinsed again and dried as prescribe above prior to weighing. This will remove any oils that may be transferred to the coupons.)
- Each coupon shall be weighed to a constant weight. The constant weight shall be two consecutive weighings of each coupon within a minimum of 0.5 milligrams of each other. Removal of incidental flash rusting prior to weighing is not necessary.

Three coupons are used in each chemical product solution and for the distilled water and Sodium Chloride control standards.

II. MEASURING OF THE COUPONS

The outside diameter, inside diameter, and the thickness of each coupon is measured twice at 90 degrees from each initial reading and the averages calculated for each measurement. The averages are then used to calculate the surface area of each coupon with the following formula:

$$A = (3.1416/2)(D^2 - d^2) + 3.1416(t)(D) + 3.1416(t)(d)$$

Where D=average outside diameter
 d=average inside diameter
 t =average thickness

Example:

$$A = (1.5708)(1.9044 - 0.3136) + 0.4768949 + 0.1935226$$

$$A = (1.5708)(1.5908) + 0.4768949 + 0.1935226$$

$$A = 2.4988286 + 0.4768949 + 0.1935226$$

$$A = 3.1692461 \text{ square inches (Total surface area of the coupon.)}$$

$$A = 3.17 \text{ square inches}$$

III. PREPARATION OF THE SOLUTIONS

ASTM D 1193 Type II distilled water is used to prepare each solution, blank, and control standard. The Sodium Chloride (NaCl) used to prepare the salt standard shall be of "ANALYZED REAGENT GRADE" quality.

A 3% solution of NaCl is prepared by weight, using the reagent grade salt and distilled water (W/V).

A **3%** solution of each chemical product to be tested is prepared using distilled water to dissolve and or dilute the chemical product. For liquid chemical products, three parts liquid chemical product (as received) is mixed with 97 parts distilled water to produce the test solution (V/V). If the chemical product is a dry product, then the 3% solution is made by weight (W/V).

All solutions including the distilled water blank are covered and allowed to sit a minimum of 12 hours to stabilize and reach equilibrium, ensure solubility and to account for any reactivity that may occur.

IV. THE CORROSION TEST

Approximately 300 milliliters (actual volume is determined by the surface area of test coupons) of each solution as mixed with distilled water and is put into a 500 milliliter Erlenmeyer flask. Each flask is equipped with a rubber stopper that has been drilled to allow a line to run through it. The hole in the rubber stopper is 3-4 millimeters in diameter. One end of the line is attached to a rotating bar and the other end of the line is attached to a plastic frame made to hold coupons inside the flask where three coupons are attached to each plastic frame. The rotating bar is controlled by an electric timer that lowers the bar for 10 minutes then raises the bar for 50 minutes out of the solution but still keeps the coupons inside of the flask for the entire duration of the test. This allows the coupons to be exposed to the test solution 10 minutes of each hour. The corrosion test is then run for 72 hours. No agitation of the solution is made during the corrosion test.

Corrosion tests are conducted at 21-23 degrees Centigrade. The room temperature is to be recorded daily during the operation of the test. The room temperature shall be taken with a calibrated thermometer located next to the corrosion-testing instrument. The temperature readings will be used to help determine varying corrosion rates, at this time temperature readings will not be used to correct data.

V. CLEANING OF THE COUPONS

The coupons are removed from the solution after 72 hours. The coupons are pre-washed under running tap water to remove any loosely adherent corrosion products. They are then placed into glass beakers containing the cleaning acid, concentrated hydrochloric acid (HCL) containing 50 grams/liter SnCl_2 (stannous chloride) and 20 grams/liter SbCl_3 (antimony trichloride). The two salts are added to the HCL to stop the reaction of the HCL with the steel once the rust or corrosion is removed. (Note: The fumes given off by the acid during cleaning contain gases formed from the antimony and are extremely hazardous, this portion of the cleaning must be conducted under a ventilated hood.)

After 15 minutes of cleaning the coupons are removed from the cleaning acid, rinsed with tap water and then distilled water, and wiped with a cloth to clean any deposit from the coupons. They are then returned to the cleaning acid and the procedure is repeated. After cleaning the coupons are rinsed in chloroform, air dried, and weighed.

Each coupon shall be weighed to a constant weight. The constant weight shall be two consecutive weighings of each coupon within a minimum of 0.5 milligrams of each other.

VI. EVALUATION OF CORROSION

The weight loss of each coupon is determined by subtracting the final weight from the original weight. The corrosion rate for each coupon is expressed as mils penetration per year (MPY) by the following formula:

$$\text{MPY} = (\text{weight loss (milligrams)}) (534) / ((\text{area}) (\text{time}) (\text{metal density}))$$

OR

$$\text{MPY} = (\text{weight loss (milligrams)}) (534) \text{ divided by } ((\text{area}) (\text{time}) (\text{metal density})^*)$$

(Density is 7.85 g/cc for steel*)

The final MPY value for each solution is determined by calculating an average of the three individual coupons. Average MPY from this point forward will be referred to as only MPY of the solution being tested. (Note: Wide variation of MPY of individual coupons inside the same flask typically indicates contamination of a coupon. If variation of individual MPY is too great to determine consistent data the test should be run over again. Typically coupon variation may run plus or minus 3 MPY.)

VII. EXPLANATION

To put the information into perspective it is necessary to briefly recap the corrosion test process. The corrosion value of the distilled water and the reagent grade sodium chloride is critical to this whole process. These are the two base lines used to determine products acceptability in terms of corrosion value only.

In the table following the distilled water proved to have a corrosion value of 6.00 MPY. The chart shows that the reagent grade sodium chloride has a corrected corrosion value of 45.00 MPY. This means that the original corrosion value of the reagent grade sodium chloride and the distilled water (in a 3% solution) was 51.00 MPY. That is, 6.00 MPY for the distilled water and 45.00 MPY for the reagent grade sodium chloride. The 6.00 MPY value for the distilled water was subtracted from the original 51.00 MPY for the reagent grade sodium chloride and distilled water solution to arrive at the distilled water corrected value of 45.00 MPY for the reagent grade sodium chloride.

The corrosion value of 6.00 MPY for the distilled water is subtracted from the total MPY for each of the 3% solutions for each product tested. When this calculation is completed for each product being tested the resulting value indicates the corrected corrosion value.

According to criteria adopted by PNS; "Only corrosion inhibited chemical products that are at least 70% less corrosive than reagent grade sodium chloride may be used". To determine if a product is acceptable, take the corrected corrosion value of the reagent grade sodium chloride and multiply it by 30%. In this case, 45.00 MPY multiplied by 30% equals 13.5 MPY which is the highest acceptable corrected corrosion value for any product in this test. Any product in this test, that produces a MPY value higher than 13.5 MPY is rejected.

VIII. NEGATIVE NUMBERS

Some products actually end up with a negative number as their corrected MPY value. A negative number is exceptionally good and it actually indicates that the product when mixed with distilled water in a 3% solution is less corrosive than distilled water.

To show an example of a negative number note that in Table 1 the distilled water in this test had a corrosion factor of 6.00 MPY. Also, note that the 3% solution of Wondermelt-A had a corrected corrosion value of -5.18 MPY. To quickly repeat the math used to arrive at this negative number the 3% solution corrosion value of 1.18 MPY, had subtract from it the distilled water corrosion value of 6.00 MPY.

This resulted in the corrected MPY value of -5.18. The larger the negative number, the better a product is in terms of corrosion inhibiting abilities.

IX. REPORTING RESULTS

Results shall be reported in Percent Effectiveness. Percent values equal to or less than 30% are passing. The distilled water corrected values of the chemical product and the salt are used to make this calculation. The corrected value of the chemical product is divided by the corrected value of the salt; this value is then multiplied by 100 to give percent.

Example: Magic Melter II has a corrected value of 10.15
Salt has a corrected value of 45.00

Therefore: $(10.15 / 45.00) \times 100 = 22.6\%$ Pass

Acme Melter has a corrected value of 19.99
Therefore: $(19.99 / 45.00) \times 100 = 44.4\%$ Fail

TABLE 1
CHEMICAL PRODUCTS CORROSION TEST RESULTS
ALL VALUES ARE DISTILLED WATER CORRECTED

PRODUCT	MILS/YEAR	PERCENTAGE	REMARKS
*Super Stuff	-0.03	-0.07	Good stuff.
*Ice Melter	0.035	0.08	Good
*Magic Melter	1.00	2.22	Smells good
*Magic Melter II	10.15	22.55	OK
Acme Melter	19.99	44.42	Nice appearance
Acme Melter-1	23.71	52.69	50% @#*&^
Wondermelt	54.07	120.16	Very corrosive
*Wondermelt -A	-5.18	-11.51	Good corrosion protection
Stuff	17.00	37.78	not so good
SALT	45.00	100.00	
Distilled Water	6.00	13.33	

* ACCEPTABLE PRODUCT

NOTE: The results used in the above table are for example only, and they are not firm numbers. The MPY corrosion values of the distilled water and the reagent grade sodium chloride may vary from test to test.

TEST METHOD B

Percent Total Settleable Solids and Percent Solids Passing on a No. 10 Sieve

This test method is used to determine the amount of total settleable solids and the percent solids passing on the No. 10 sieve that are generated from a liquid chemical product when stored at a specified cold temperature without agitation.

Settleable Solids for this procedure are typically formed from chemical precipitation, chemical crystallization, or by the dense settlement of any other components of the deicing product.

Chemical precipitates are formed when specific chemical constituents within the liquid chemical product react together chemically.

Chemical crystallization begins to form when a solution is cooled below its chemical saturation point. Crystallization is the physical characteristic by which a liquid begins to turn to a solid. This physical characteristic is typically used to identify the freezing point of a liquid. This test will determine if the deicing solution can maintain its liquid state at the supplied concentration and at the specified testing temperature with no agitation.

The settlement or separation of additional component(s) (i.e. inhibitors) of the product will be examined for the formation of a dense solid layer and the ability of the chemical product to maintain a non-stratified suspension without agitation.

Total settleable solids will consist of all described parameters excluding soft settling stratification as outlined in the test methodology.

Percent Solids Passing on the No. 10 Sieve will be measured by subtracting the volume of solids retained on the sieve from the total sample volume.

I. Apparatus

- 1-Liter Plastic Graduated Imhoff Cone with bottom plug
- ASTM E 11 No. 10 sieve
- Rubber policeman
- Graduated cylinder
- Watch glass
- Freezer

II. Test Method

Place 1000 ml of a well-mixed (non-diluted) liquid chemical product into a graduated one-Liter Imhoff cone. Place this sample into a freezer, which has been precalibrated and stabilized to the correct specified temperature as established in each liquid chemical product category. Cover the sample with a watch glass. The sample shall remain in the freezer unagitated for a period of 168 hours. Record the temperature of the freezer daily to assure proper testing temperature. After 168 hours the sample is carefully removed from the freezer for testing.

1. Total Settleable Solids

This test method will be used to determine if the liquid chemical product is usable and if it requires agitation. It will determine the detrimental amount of settlement formed from chemical precipitation, chemical crystallization, or by the dense settlement of any other component(s) of the deicing product.

The formation of chemical precipitation and/or chemical crystallization above the prescribed limit is cause for rejection. These characteristics are observed by a dense formation of precipitate and/or crystals in the cone.

Various levels of crystallization may be present if the chemical product concentration is at or near its freezing point.

The settlement of other chemical product components that can produce a dense solid layer above the prescribed limit will be cause for rejection. Stratification of material exhibited by phase separation or exhibiting a soft settlement is not to be interpreted as a dense solid layer. This type of separation is a result of the chemical product not staying homogenous through the test conditions. Samples submitted that exhibit stratification but pass all other specifications will be passed and will be categorized as "Requires Agitation".

The time used to evaluate each sample should be kept to a minimum because as the deicing solutions warm the physical characteristics within the solution change

Remove the sample contained in the Imhoff cone from the freezer. Determine readings as soon as possible because sample temperature begins to rise immediately after being removed. Measure and record the volume of settleable solids using the calibrated gradations on the cone. (Note: If the settled matter contains pockets of liquid between large settled particles, estimate the volume of these and subtract them from the volume of settled solids.)

For transparent liquids the determinations are easily determined by directly reading the volume of the settleable solids in the bottom of the cone.

For liquids that are not transparent due to the addition of organic matter type inhibitors, the following method shall be used.

Determine and record the interface layer volumes of the inhibitor and the concentrated amount of material in the bottom of the cone.

Determine if the settlement in the bottom portion of the cone is a dense formation or soft settling due to a phase separation. This is done by using an eight-millimeter diameter solid glass rod of sufficient length to reach the bottom of the cone. The rod diameter should allow the rod to be inserted to the bottom of the cone and large enough to be able to determine the slightest resistance. Gently insert the rod into the cone containing the product and gradually lower the rod to the bottom of the cone. If resistance is such that the rod does not reach the bottom of the cone, mark the rod level at the top of the cone and remove it. Place the rod on the outside of the cone with the mark even with the top of the cone. Read and record the volume gradation from the cone that corresponds to the tip of the rod. This will represent the volume inside the cone where resistance was encountered in the product. This volume reading is to be interpreted as a dense settlement and must not exceed the specification limit. If the rod goes completely to the bottom of the cone with no resistance record that no dense settlement was found.

If stratification is present, gently hand stir the chemical product in a clockwise direction for 45 revolutions in one minute to see if the sample will re-homogenize. Examine the chemical product again, with the light if necessary, to determine phase stratification interface levels remaining, if any. Record new levels if present. If no levels are detectable and the solution is returned to a homogenous state exhibiting no stratified layers the chemical product will be marked "Requires Agitation". If levels of stratification are still present, mark as "Requires Extreme Agitation."

The total settleable solids volume shall consist of the accumulated amounts of chemical precipitation, chemical crystallization, and the dense portion of any other constituents. The total settleable solids are reported in percent based upon the volume to volume (V/V) ratio of the settleable solids to the initial sample size.

2. Percent Solids Passing the 10 Sieve

This procedure must be conducted as fast as possible after determining the total settleable solids so that any frozen chemical crystalline materials are adequately evaluated.

Immediately after determining the total settleable solids remove the tip on cone and pour the sample through an ASTM E 11 certified Number 10 sieve. The sieve should be kept in a mixture of ice and water to keep it cold before using and between samples. Rinse the sieve with water to remove any traces of the previous sample prior to placing in the ice bath. Before using the sieve briefly shake excess water from the sieve.

The sample should be poured through one-quarter section of the sieve if possible to reduce the surface area from which the sample must be retrieved. The sample on the sieve is not rinsed or pushed through the sieve by any means. All material not flowing through the sieve is rubber policed from the sieve into a graduated cylinder and the volume measured and recorded. Rubber police only the side of the sieve the material was place on to pass through. Material that is trapped in the mesh of the sieve and does not come loose on the face of the sieve is considered passing and is not included. This volume is subtracted from the total volume of the sample to calculate the sample volume passing. The solids passing the No. 10 sieve are reported in percent based upon the volume to volume (V/V) ratio of sample volume passing to the initial sample size.

-

- * Check our website for the latest addendum to the IFB
- * Sign and return each addendum as required
- * Review Standard Terms and Conditions
- * Properly identify return envelope
- * Sign your bid on the front page
- * Initial any bid changes you made
- * Submit two 1-quart samples
- * Review and complete all requirements listed herein to ensure compliance

[illegible]

- 28 -